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RESEARCH ARTICLE (ORIGINAL)

Nurses' perceptions of decision-making skills in the Manchester Triage System

Perceção dos enfermeiros das competências de tomada de decisão na triagem de Manchester

Percepción del personal de enfermería sobre las competencias de toma de decisiones en el triaje de Mánchester

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Abstract
Background: Priority triage is a complex decision-making process used to assess clinical severity.
Objective: This study aims to explore the association between the socio-professional characteristics of emergency department nurses and their perceptions of decision-making skills during triage.
Methodology: A cross-sectional descriptive-correlational study was conducted with a sample of 47 nurses. The Portuguese version of the Triage Decision-Making Inventory (TDMI) was used for data collection.
Results: Regarding nurses' perceptions of their decision-making skills, the highest mean score (4.94 ± 0.420) was found in cognitive characteristics/Skill confidence and the lowest mean score in Intuition (4.44 ± 0.697). Significant correlations were found between cognitive characteristics/skill confidence, intuition, and critical thinking and the length of experience in emergency departments, as well as between cognitive characteristics/Skill confidence and the triage nurses' age and professional experience.
Conclusion: Experience in the emergency department has a positive impact on triage decision-making skills. Nurses place the highest value on cognitive characteristics/skill confidence.

Keywords: emergency service, hospital; triage; nurse; decision making

Resumo
Enquadramento: A triagem de prioridades caracteriza-se por um complexo processo de tomada de decisão que visa avaliar a gravidade clínica.
Objetivo: Analisar relações entre as características socioprofissionais dos enfermeiros de um serviço de urgência e a perceção das competências de tomada de decisão na triagem.
Metodologia: Estudo descritivo-correlacional e transversal. A amostra foi de 47 enfermeiros e para a recolha de dados recorreu-se ao *Triage Decision Making Inventory*, versão portuguesa.
Resultados: Na perceção das competências de tomada de decisão, as características cognitivas/confiança na habilidade obtiveram a média mais elevada (4,94 ± 0,420) e a Intuição a média mais baixa (4,44 ± 0,697). Observaram-se correlações significativas entre as características cognitivas/confiança na habilidade, intuição, pensamento crítico do triador e o tempo de experiência no serviço de urgência, bem como, entre a idade do triador, a experiência profissional e as características cognitivas/confiança na habilidade.
Conclusão: A tomada de decisão na triagem é influenciada positivamente pela experiência no serviço de urgência, sendo as características cognitivas/confiança na habilidade as competências mais valorizadas pelos enfermeiros.

Palavras-chave serviço hospitalar de emergência; triagem; enfermeiro; tomada de decisão

Resumen
Marco contextual: El triaje de prioridades se caracteriza por un complejo proceso de toma de decisiones dirigido a evaluar la gravedad clínica.
Objetivo: Analizar la relación entre las características socioprofesionales del personal de enfermería de un servicio de urgencias y su percepción de las competencias para la toma de decisiones en el triaje.
Metodología: Estudio descriptivo-correlacional de corte transversal. La muestra estuvo constituida por 47 enfermeros y los datos se recogieron mediante el Triage Decision-Making Inventory, versión portuguesa.
Resultados: En la percepción de las competencias para la toma de decisiones, las características cognitivas/confianza en la habilidad tuvieron la media más alta (4,94 ± 0,420) y la Intuición tuvo la media más baja (4,44 ± 0,697). Se observaron correlaciones significativas entre las características cognitivas/confianza en la habilidad, la Intuición y el pensamiento crítico del enfermero de triaje, y la antigüedad en el servicio de urgencias, así como entre la edad del enfermero de triaje, la experiencia profesional y las características cognitivas/confianza en la habilidad.
Conclusión: La toma de decisiones en el triaje está positivamente influenciada por la experiencia en urgencias, y las características cognitivas/confianza en la habilidad son las competencias más valoradas por los enfermeros.

Palabras clave: servicio de urgencia en hospital; triaje; enfermero; tomada de decision

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Introduction

Emergency departments (EDs) experience significant patient flows, with many presenting non-urgent conditions, which result in overcrowding. As a response, priority systems have been implemented to improve efficiency and provide more humanized care to patients in EDs.
Priority triage is a clinical risk management strategy that enables managing time to provide care to those that need it (*Grupo Português de Triagem* - Portuguese Triage Group [GPT], 2010), enhancing patient safety, providing effective and efficient care, and using validated protocols, such as the Manchester Triage System (MTS).
Nurses play a crucial role in Portuguese EDs as they are usually responsible for providing a fast initial patient assessment and determining patients' clinical priorities. Nurses' triage decisions are pivotal to patient admission to the ED and set the tone for the entire care process. Therefore, it is imperative that nurses possess the necessary skills to make adequate decisions (Dippenaar & Bruijns, 2016). This study explores the association between the socio-professional characteristics of ED nurses and their perceptions of triage decision-making skills.

Background

In recent decades, several triage systems have been implemented worldwide to improve the quality of care through criteria established based on illness severity (Azeredo et al., 2015). In Portugal, the MTS is the predominant triage system used in most EDs to aid nurses in deciding patients' clinical priorities. Triage nurses must complete an initial training course on this method. However, nurses' successful completion of this training does not result in immediate proficiency, as, according to the GPT (2010), expertise develops through experience. The Emergency Nurses Association (2011) also emphasizes that the initial training does not fully prepare nurses for the complex task of triage, as the competence of a triage nurse requires specialized training and demonstration of the skills necessary for effective triage. Gómez-Rojas (2015) defines competence as the capability to use knowledge (*savoir*), skills (*savoir-faire*), and attitudes (*savoir-être*) in professional practice. According to this author, competence is acquired through practice, which supports Patricia Benner's (2001) model that highlights the importance of acquiring knowledge and enhancing skills throughout one's career. Thus, as also noted by Yoon and Son (2021), the knowledge and skills of proficient nurses enable them to understand several situations and triage patients effectively.
The triage process begins with the nurse welcoming the patient, obtaining information, and performing a brief physical assessment to identify signs and symptoms and recognize patterns. Nurses evaluate the patient's triage priority level based on their clinical judgment and logical reasoning (Acosta et al., 2012). Although nurses use a protocol, this decision-making process relies on triage nurses' knowledge and experience (Costa et al., 2021; Marques, 2014), as well as on evidence-based decisions, for which reason it should be performed by experienced nurses (Costa et al., 2022).
Reay et al. (2019) suggest that experience enables nurses to assess situations that require immediate intervention or when there is a difference between the assessment findings and the information provided by the patient. These authors state that past clinical situations are important for nurses to make their triage decisions by comparing similar clinical situations to establish appropriate clinical priorities. The participants in Reay et al. (2019) study also report that this skill can only be acquired through years of professional experience and expertise development. Amaral (2017) adds that triage decision-making is influenced by nurses' professional experience, continuous training, and clinical practice. Fathoni et al. (2013) consider that knowledge and experience in caring for critical patients and advanced postgraduate training also contribute to enhancing triage decision-making skills. In their integrative literature review, Acosta et al. (2012) emphasize that theoretical knowledge is essential for accurate triage performance. They cite a study in Sweden showing that nurses lacking knowledge may prioritize patients in a manner inconsistent with the clinical condition and other studies demonstrating that the more experience nurses acquire in EDs, the more accurate their triage decisions are.
Sound triage decision-making requires a combination of reasoning and intuition based on professionals' knowledge and skills (Crossetti et al., 2014; Mackway-Jones et al., 2014). According to Hagbaghery et al. (2014), nurses' skills are crucial in triage decisions. Acosta et al. (2012) argue that nurses use intuition, theoretical knowledge, confidence, and courage to make triage decisions and that these skills are developed through experience and observation. The GPT (2010) also identifies pattern recognition, hypothesis formation, and mental representation as decision-making skills necessary for triage nurses. Considering the complexity of triage decisions, nurse specialists can assume a key role in triage within a short period. These professionals are recognized for their expertise in care management, which enhances the effectiveness of the response of the health team and ensures the safety and quality of care (Regulamento nº 140/2019 da Ordem dos Enfermeiros, 2019).
Research on nurses' triage decision-making is still in its early stages in Portugal. Therefore, this study considers it relevant to investigate this phenomenon, as ED nurses' triage decisions significantly impact the entire care process.

Research question

What is the association between ED nurses' socio-professional characteristics and their perceptions of triage decision-making skills?

Methodology

A cross-sectional, retrospective, and descriptive-correlational study was conducted with a non-probability sample of 47 nurses, with a sampling rate of 89%, in a medical-surgical ED in northern Portugal using the MTS. A two-part questionnaire was used for data collection. The first part was designed specifically for this study to collect socio-professional data. The second part focused on decision-making and used the Portuguese version of the Triage Decision-Making Inventory (TDMI) by Marques (2014). The TDMI includes 36 items rated on a six-point Likert scale. After the validation study with the Portuguese population (Marques, 2014), it was divided into three subscales: Cognitive characteristics/Skill confidence, Intuition, and Critical thinking. Subscale scores were calculated as weighted means, with higher scores indicating a more positive perception. Its internal consistency was considered very good ($\alpha = 0.935$).

Data were collected from February to March 2020. Descriptive statistics and inferential analysis techniques were used for data processing. For quantitative variables, assumptions of normal distribution were assessed, and the two-tailed Student's *t*-test was used. Furthermore, the one-way ANOVA test was used to compare means in variables with more than two categories, normal distribution, and homogeneity of variance. The non-parametric Kruskal-Wallis test was used when assumptions were not met. Pearson's correlation coefficient was used to measure the correlation between two quantitative variables. Data were processed using IBM SPSS Statistics software, version 26.0 for Windows. A 5% significance level was used. This study followed the principles of research ethics. It was authorized by the Board of Directors of the healthcare institution where it was conducted and received a favorable opinion from its Ethics Committee (Reference no. 15/202).

Results

The majority of participants were women (74.5%) aged 27 to 63 years, with a mean of 41.02 ± 9.389 years and a median of 39 years. The most prevalent age group was 31-40 years (44.7%), followed by 41-50 (27.7%). The under-35 and over-50 age groups were less prevalent (10.6% and 17%, respectively). Most nurses had a bachelor's degree (85.1%), 12.8% a master's degree, and 2.1% a *bacharelato* (three-year degree). Regarding the professional category, 63.8% of them were nurses, and 36.2% were nurse specialists. Professional nursing experience and ED experience were categorized according to Benner's (2001) skills development model into ≤ 2 years, 3-5 years, and > 5 years. The length of professional experience ranged from 5 to 41 years, with a mean of 17.91 ± 9.122 years and a median of 16 years. Most participants had over 5 years of work experience (89.4%). Their professional experience in the ED ranged from 1 to 40 years, with a mean of 11.77 ± 9.185 years and a median of 10 years. The majority of nurses (74.5%) worked in the ED where the study was conducted for over 5 years. With regard to the frequency with which nurses performed triage, 14.9% performed it more than 10 times per month, 48.9% 6 to 10 times, and the others less than 5 times per month. The majority of nurses (44.7%) completed their triage training 3 to 5 years ago, 34% over 5 years ago, and the others within the last 2 years.

Concerning nurses' perceptions of their triage decision-making skills, the subscales Cognitive characteristics/Skill confidence and Critical thinking obtained the highest means (4.94 ± 0.420 and 4.84 ± 0.609, respectively), while Intuition had the lowest mean (4.44 ± 0.697), as shown in Table 1.

Table 1

Descriptive statistics of the TDMI (n = 47)

TDMI Subscales/Total	Minimum	Maximum	Mean±*SD*	Median
Cognitive characteristics/ Skill confidence	4.06	5.63	4.94±0.420	4.94
Intuition	3.00	5.78	4.44±0.697	4.44
Critical thinking	3.42	5.91	4.84±0.609	5.00
TDMI	1.83	5.56	4.78±0.493	4.81

Note. TDMI = Triage Decision-Making Inventory; *SD* = Standard deviation.

The analysis of the association between nurses' perceptions of their triage decision-making skills and their socio-professional characteristics showed weak positive correlations between age, the TDMI total score, and the cognitive characteristics/Skill confidence subscale, between the length of professional experience and the cognitive characteristics/skill confidence subscale ($R = 0.339$, *Sig.* = 0.02), and between the length of experience in the ED, all the TDMI subscales, and the TDMI total score. The correlation was low in the Critical thinking subscale and moderate in the other TDMI subscales and the TDMI total score (Table 2), which is not apparent in the other variables.

Table 2

Correlation between ED nurses' age, length of professional experience, length of experience in the ED, and the TDMI subscales and the TDMI total score (n = 47)

	Cognitive characteristics/ Skill confidence		Intuition		Critical thinking		TDMI	
	R	*Sig*	*R*	*Sig*	*R*	*Sig*	*R*	*Sig*
Age	0.350	0.016	0.248	0.093	0.194	0.191	0.293	0.045
Length of professional experience	0.339	0.020	0.177	0.233	0.178	0.232	0.258	0.080
Length of experience in the ED	0.464	0.010	0.476	0.010	0.338	0.020	0.470	0.010

Note. TDMI = Triage Decision-Making Inventory; *R* = Pearson's correlation coefficient; *Sig* = Significance; ED = Emergency Department.

No statistically significant differences (Sig. > 0.05) were found in nurses' perceptions of their triage decision-making skills based on gender, education level, professional category, frequency of triage, and latest triage training.

Discussion

The sample consisted of 47 nurses, mostly women aged between 31 and 40 years. These data corroborate the historic association between the Nursing profession and the female gender and reflect the structure of the nursing profession in Portugal, where 82.3% of nurses in 2020 were women (*Ordem dos Enfermeiros* - Portuguese Nursing Regulator [OE], 2021).

The complex clinical conditions that bring patients to the ED demand a prompt, safe, and high-quality response, requiring nurses to invest in lifelong training. Nurses in the study held degrees and/or specializations, with over a third of them having specialized nursing training. These results may be associated with the recommendations of the OE for safe nurse staffing and adjustment of the human resources to meet the population's care needs. Therefore, based on OE Regulation No. 140/2019 of 25 September, ED teams are required to have at least 50% of nurses specialized in Medical-Surgical Nursing. Benner (2001) argues that competence is transformed by experience and mastery of practice, stemming from the link between theoretical and practical knowledge. Thus, experience plays a critical role in expertise development. Although Benner's (2001) concept of experience is more encompassing, covering more than just the passing of time, this study's authors consider that the expert level is achieved with an average of five years of experience in clinical settings. Based on this criterion, the majority of the ED nurses in this study are experts both in terms of their length of professional experience and length of experience in the ED. Specific triage training is essential for an objective, standardized, and systemized performance (GPT, 2010; Mackway-Jones et al., 2014). About two-thirds of the nurses had completed their training in the MTS in the past 5 years. According to the GPT (2010), nurses can attend MTS training after 6 months of professional experience in the ED or whenever MTS protocols are updated, as it happened in 2015 in the ED where the study was conducted. Most nurses performed triage more than six to 10 times per month, indicating a significant level of experience in this activity. Triage is a critical activity in the ED for patient classification, care prioritization, and resource allocation to ensure quality care and patient safety. Therefore, nurses should acquire the decision-making skills necessary to perform triage efficiently. The TDMI was used to assess nurses' triage decision-making skills by identifying their perceptions of these skills. In this inventory, higher mean scores correspond to more advanced triage decision-making skills (Marques, 2014). Triage nurses had a very positive perception of their decision-making skills. The TDMI total mean score was 4.78 ± 0.493, similar to the score (5 ± 0.453) of the validation study in Portugal (Marques, 2014). Given that the TDMI includes skills related to nurses' Intuition, Critical thinking, and Cognitive characteristics/Skill confidence, these scores may be associated with triage nurses' experience in ED settings (74.5% have more than 5 years of experience) and their monthly frequency of triage experiences. Caring for critical patients provides nurses with the ability to assess and prioritize care (Fathoni et al., 2013), which is very similar to priority triage. Nurses' level of experience allows them to understand situations and make adequate decisions based on previous experiences (Reay et al., 2020). Therefore, experience increases confidence and accuracy in decision-making (Yoon & Son, 2021). The triage nurses in the study had extensive professional experience, particularly in emergency settings, which enhanced their knowledge and skills and increased their confidence, influencing their perceptions of decision-making. Triage nurses' positive perceptions of their decision-making skills may also result from the knowledge and skills acquired from specialized and continuous training. It should be noted that around a third of them were nurse specialists and that most nurses had completed their latest triage training within the past five years. These data align with those found by Fathoni et al. (2013), who concluded that nurses with a graduate degree in critical care had more triage decision-making skills.

The mean scores for the subscales Cognitive characteristics/Skill confidence, Intuition, and Critical thinking range from 4.44 ± 0.697 to 4.94 ± 0.420, which is similar

to the TDMI total scores. However, the level of agreement between nurses was lower in the Intuition subscale, which had the lowest mean scores and the highest range of answers (a minimum of 3 and a maximum of 5.78). These results are consistent with those Marques (2014) found, indicating that nurses have a less positive perception of Intuition as a triage decision-making skill. Crossetti et al. (2014) defines intuition as a perceptive sensation, an impression, and a highly subjective skill. Thus, it is difficult to understand and measure its contribution to decision-making. Nonetheless, some authors argue that intuition is an essential skill in triage decisions, particularly in difficult situations (Mackway-Jones et al., 2014; GPT, 2010).

The Cognitive characteristics/Skill confidence subscale includes skills such as prioritization, organization, clinical judgment, and knowledge. This subscale had the highest mean score, suggesting that nurses perceive them as important skills in triage decisions. These findings may also be associated with the fact that these skills are easily described and assessed and, consequently, applied by professionals in their decision-making processes. Crossetti et al. (2014) obtained similar results, concluding that nurses prioritize knowledge, clinical experience, reasoning, patient assessment, and professional ethics. Furthermore, Acosta et al. (2012) argue that an objective and organized triage assessment can reveal patterns and that nurses can make decisions regarding patient priority based on their clinical and critical judgment.

Multiple factors can influence nurses' complex triage decision-making, ultimately affecting the overall care process in the ED (Costa et al., 2021). Triage nurses should have organization and prioritization skills, especially when required by contextual factors such as high patient flows. They should also possess substantial knowledge to assess the patient and identify severity criteria to make an accurate clinical judgment. Thus, nurses perceive organizational and prioritization skills, knowledge, clinical judgment, critical thinking, and intuition as essential skills for making decisions during triage.

The analysis of the association between nurses' socio-professional characteristics and their perceptions of triage decision-making skills indicates a weak but positive correlation between age and the total TDMI score and the cognitive characteristics/skill confidence subscale. This result may suggest that older nurses have more professional experience, knowledge, and skills, becoming more confident in making decisions. Thus, it can be concluded that nurses' age affects their perceptions of their triage decision-making skills and contributes to developing cognitive characteristics and skill confidence. No significant differences were found between male and female nurses, which is consistent with the results found by Amaral (2017). This finding may be associated with the fact that essential skills required for triage and assertive decision-making are developed through experience, training, practice, and knowledge acquisition (Acosta et al., 2012; Fathoni et al., 2013; Marques, 2014), which occur regardless of the professional's gender. No significant differences were also found based on nurses' educational level, which aligns with the results found by Amaral (2017). Nonetheless, Fathoni et al. (2013) found that nurses' graduate education influences their triage decisions.

Regarding professional experience, significant associations were found in the cognitive characteristics/Skill confidence subscale. Professional experience is a way to gain practical knowledge to support decision-making (Benner, 2001) and through this body of knowledge, expert nurses transmit confidence and novice nurses seek their help to clarify their doubts (Acosta et al., 2012). Therefore, more years of experience are expected to provide increased cognitive skills and confidence, which will influence triage decisions. Marques (2014) found that triage nurses with more years of professional experience had slightly more positive perceptions of their triage decision-making skills. Fathoni et al. (2013) also confirm the association between professional expertise and triage decision-making skills. The knowledge acquired through clinical practice, namely through the systematic assessment of critical patients, the search for signs and symptoms of severity, and the identification of areas of potential instability, enables nurses to develop intuitive and critical thinking skills. Positive correlations were found between nurses' experience in ED settings and their perceived triage decision-making skills, with similar results to those found by Marques (2014). Fathoni et al. (2013) argue that experience in the ED, particularly over 5 years, influences the ability to perform triage. This aspect may explain some of the results found in this study given the nurses' socio-professional characteristics, namely their positive perceptions of their decision-making skills. The study found no significant correlations between clinical practice, particularly the frequency with which nurses perform triage, and their latest triage training and perceived triage decision-making skills. This finding contradicts the results of Amaral (2017) and Fathoni et al. (2013). Supporting the results of this study, the GPT (2010) mentions that triage training involves presenting the method to the nurses, enabling them to carry out this task. However, this training is not enough because nurses' experience, knowledge, intuition, and critical thinking are essential for making effective decisions during triage.

The main limitations of this study are the use of a non-probability sampling method, the limitation to a single ED, and the lack of scientific research in this area.

Conclusion

Given that nurses' triage decisions influence the quality of care and patient safety in the ED, working as a triage nurse brings more responsibilities and difficulties to nurses. However, nurses' triage decision-making skills are still under-explored.

This study revealed that triage nurses consider that they have the skills necessary to make triage decisions: Cognitive characteristics/Skill confidence, Intuition, and Critical thinking. It also concluded that professional experience in an emergency setting is the most influential factor in

triage decision-making skills.
This study aims to establish a conceptual framework with the potential to change clinical practice through reflection on decision-making skills and provide visibility to nurses' autonomous practice. Healthcare institutions are increasingly expected to promote and offer continuous training to their professionals to ensure high-quality standards and patient safety. In addition to training, research should be conducted using research designs to further explore the triage decision-making process, such as assessing the triage process in clinical practice through observation.

Author contributions

Conceptualization: Azevedo, C., Graça, L., Sousa, C.
Data curation: Azevedo, C., Graça, L., Sousa, C.
Methodology: Azevedo, C., Graça, L., Sousa, C.
Writing – original draft: Azevedo, C., Sousa, C.
Writing – review & editing: Azevedo, C., Sousa, C.

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